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STATEMENT OF QUALIFICATIONS AND EXPERIENCE

Woodward-Clyde Consultants

EASTERN REGION
5120 BUTLER PIKE
PLYMOUTH MEETING
PENNSYLVANIA 19462

SUPPLEMENT TO
QUALITY ASSURANCE PROJECT PLAN
RI/FS WORK PLAN
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TAI ENVIRONMENTAL SCIENCES, INC.

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

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1.0 INTRODUCTION

TAI ENVIRONMENTAL SCIENCES, INC.

1717 OLD SHELL ROAD MOBILE, ALABAMA 36604 (205) 479-0394

TAI Environmental Sciences, Inc. in Mobile, Alabama, offers services in the applied environmental sciences to government, industry, and professional consulting organizations.

TAI scientists have successfully applied their expertise to environmental monitoring programs, permitting programs, environmental impact statements (EIS), environmental inventories, resource management studies, bioassays, hazardous waste determinations, and site selection studies. Specialized experience has established the basis for quality technical service. Extensive experience assures effective project management, and a responsive, cost-efficient, and realistic approach to client needs.

We at TAI are proud of our record of professional service and welcome the opportunity to serve you.

ENVIRONMENTAL DISCIPLINES

- Ecology
- Water Quality
- Water Quality Modeling
- Aquatic Taxonomy
- Data Management
- Regulatory Permitting
- Hyrdology
- Hyrdologic Simulation
- Civil Engineering
- Systems Ecology
- Aquatic Chemistry
- Bioassay Testing
- Statistical Analysis

ENVIRONMENTAL EXPERIENCE

- Environmental Monitoring
- Environmental Impact Statements (EIS)
- Water Quality Studies
- Water Resource Management
- Environmental Assessments (EA)
- Regional Impact Studies
- Vegetation Surveys
- Dredge Monitoring
- Permitting and Compliance Studies
- Site Selection Studies
- Drainage Design
- Hazardous Waste Determination
- Waste Treatment Studies

2.0 SERVICES AND CAPABILITIES

CAPABILITY: Modeling, Statistics and Automated Mapping

INTRODUCTION

TAI Scientists have applied their expertise in a wide variety of Environmental Engineering projects involving complex modeling, statistical and automated mapping applications on mainframe, minicomputer and microcomputer systems. These applications have included the use of simple input-output type models for stormwater impact monitoring, the development of complex algorithms for predicting the growth and impact of macrophyte growth in manmade reservoir systems, the application of multivariate statistical techniques to water quality problems and the automated mapping of habitat types for hundreds of square miles of coastal estuary. This background of diverse experience translates into a unique understanding by the TAI scientific team of the complexity of environmental problems and how the application of computer techniques can be used to find their solution.

MODELING

Modeling techniques are used in the solution of a wide variety of environmental problems including water quality prediction, fate modeling of environmental contaminants, tracer studies and for calculating parameters used in many aspects of engineering design. TAI scientists have directly developed algrithms for complex systems analysis models using languages such as FORTRAN, PL/1 and the C programming language and have applied various high level computer simulation languages such as CSMP, DYNAMO (on mainframes) and STELLA (on microcomputers). This wide variety of experiences ensures our clients that the appropriate computer tools will be used in solving their problem in the most expedient and efficient manner.

In addition to the custom development of models for unique problems, TAI scientists have extensive experience using a variety of models for solving environmental problems including all of EPA's models for surface water applications. This includes experience with such models as UPLUME and DKHDEN for predicting effluent plume behaviour, QUAL2 and WASP (both EUTRIWASP AND TOXIWASP) for predicting water quality impacts, DYNHYD3 and CAFE II for hydrodynamic predictions, STORM and SWMM II for stormwater routing and ANNIE and DYNTOX for toxics modeling. Our commitment to following the development of these models by the agencies again ensures that state-of-the-art models will be applied to a particular problem. A partial list of models available in the TAI computer library is presented in Table 1.0.

Education and work experience of key laboratory members.

Personnel	Education Degree	Years of Experience
Eldon C. Blancher II	Ph.D.	1977-88
Charles E. Tucker	B.S.	1982-88
Randy L. Austin	M.S.	1982-88
Lewis Waller	B.S.	1980-88
Vicki Spence	B.S.	1985-88

Individual Industrial References on Toxicity Testing

Mr. Walter Galacki
M&T Chemicals, Inc.
Executive Offices
One Woodbridge Center
Woodbridge, New Jersey
(201) 499-2405

Dr. Victor Gulas
J.M. Montgomery Engineers
3200 Ridgelake Dr. Suite 400
Metairie, Louisiana 70002
(504) 835-4252

Carl Lohman
Trinova Corporation
1750 Indian Wood Circle
Maumee, Ohio 43537
(419) 891-2332

CAPABILITY: Toxicity Testing and Bioassay Services

TAI is a private corporate enterprise with offices and laboratories located in Mobile, Alabama. Facilities include biomonitoring, aquaculture and taxonomic laboratories, two research vessels, and our corporate offices.

TAI's bioassay staff currently consists of three scientists and six technicians, each thoroughly familiar with the EPA methodology required for conducting both acute and chronic toxicity testing. Computer personnel specializing in data management and statistical analysis complete the proposed team of specialists ready to provide quality controlled - cost effective services to Government and Corporate clients.

TAI's bioassay laboratory currently processes an average of 32 tests, both acute and chronic, each month. Each of these tests produce biological, chemical, and physical data that require a professional approach to assure proper and accurate analysis.

Technical Experience of Personnel

The TAI Bioassay team consists of highly competent, well qualified scientists and technicians, with all of the capabilities and experience to successfully complete required services. The following Table shows the education and work experience of each member on the proposed project team. Additionally, the resumes of key personnel are included in the Appendix of this document. TAI is solely responsible for the performance of its personnel.

Project Experience

TAI's corporate experience in biomonitoring, utilizing bioassay testing, includes an extensive list of private, municipal and corporate clients. This experience includes both acute and chronic projects, ranging from permitting and research oriented testing to 30-day private contracts requiring rapid-accurate results.

TAI has been providing bioassay services since 1977, and has consistently delivered prompt reliable results. This experience is well documented in the summary overviews of TAI projects that are included in this document in section 4.0. Also, TAI has related experience in water quality monitoring, isopleth studies, computer modeling (including mixing zone, wastewater and stormwater modeling), data management, and statistical analysis to provide a broad base support structure in addition to our in-house testing and aquaculture laboratory.

CAPABILITY: Sediment Vertical Profile System Surveys

INTRODUCTION: The sediment vertical profile camera technology can provide precise quantitative data on physical and biological characteristics of the sediment surface and the immediate subsurface sediment layers. The system can detect layers of sediment strata and material overburdens on the order of 1-2 millimeters to a depth of 20 cm. TAI scientists have used sediment vertical profiling to determine the movement of dredge materials and the incorporation of the newly dredged materials into the underlying sediments by both physical disturbance and bioturbation. It has also been used to evaluate the effectiveness of cap placement in covering contaminated sediment strata, in determining the impact of suspended sediment plumes following dredged material disposal and in mapping the biological communities in coastal areas as an indicator of areas receiving impacts from outfalls.

Our approach to sediment vertical profiling reflects experience with the technique and an understanding of its strengths and weaknesses. Sediment profiling has been proven to be a useful tool in evaluating conditions in surface sediments before and after disposal operations where varying loads and type of materials have been applied. It can be most effectively used to map the bottom for subsequent sampling with conventional physical, chemical and biological methods.

Sediment vertical profile systems can address the question of discharged material placement and movement directly. It can also answer the question of what of what happens to certain material over time. The actual mechanisms involved in the movement and disappearance can only be inferred from sediment profile when coupled with other classic assessment methodologies. Sediment profiling can also give indications of biological condition in terms of indirect evidence.

METHODOLOGY:

1) Sediment profile imagery are obtained at designated baseline stations with 20 percent replication. We use a Sediment profiling imaging system equivalent to the Benthos model 3731 with capabilities of obtaining both 35mm and video images. The advantages and of video capture over 35 mm photographs are that real-time imaging is possible with video. Also, ship board analysis is also possible saving expensive boat time for system redeployment. The major advantage of 35 mm photographic images is in the high resolution of the image obtained. The Chorus Data IC 3300 image processing system is used to analyze the images.

2) As with any field gear, there are times when sediment profiling does not obtain a good image. The failure rate from poor deployment, overpenetration, disturbed sediment slice and camera problems has typically been found to be about 5-10%. Our system utilizes a video system which can take a continious record of the camera penetration on contact with the bottom in order to minimize the above problems. Additionally, our camera is outfitted with an optical fiber sensor to detect bottom contact by light interuption rather than mechanical means. This is especially useful in situations where mechanical contact fails to trip the camera because the density of the sediments at the surface allows the camera to overpenetrate the sediment-water interface.

3) Since the main objective of the sediment profiling is usually to document the thickness and impacts of the disposal of foreign, we usually propose to process both color and black and white images. Our experience in previous studies has shown that color images often provide the best contrast for identifying the dredged material layers and the reduced potential discontinuity boundry. The image analysis will be performed on filtered color images since the tonal qualities far exceed those of black and white images.

PRODUCTS:

Products available from TAI's system include sediment imagery in several photographic formats. Video tapes of the image sequences are also available and are usually provided for archive purposes. Digitized images are available on a variety of computer media and can be accessed by microcomputer systems equiped with appropriate imaging boards by dBase III+ software systems.

In addition to the derived data various displays of the information in contour and 3D plots are available for analysis. Examples of the visual displays and associated data and statistics are available on request from TAI.

STATISTICS

TAI scientists have broad experience in the use of statistical techniques to environmental problems. This familiarity has come with the application of descriptive, analytical (both parametric and non-parametric) and exploratory statistics in a problem solving context. Extensive use of a variety of computer packages including SAS, SPSS and BMDP on computers ranging from microcomputers to mainframes has made TAI scientists experts in the these type of statistical applications.

AUTOMATED MAPPING AND GEOGRAPHIC INFORMATION SYSTEMS (GIS)

The utilization of automated mapping facilities is fast becoming an important aspect of environmental analysis for determing habitat areas, area of impacted environments, and various Environmental Assessment (EA) type studies such as corridor analysis and dredged material disposal. TAI scientists have utilized both standard computer automated drawing (CAD) packages (AUTOCAD, Generic CADD) and true GIS type systems (MOSS and ARCINFO) for analyzing environmental data.

CAPABILITY: Ecological Surveys and Taxonomy

INTRODUCTION: The primary element in performing Environmental Impact Studies (EIS) and Environmental Assessments (EA) is the basic environmental or ecological survey. TAI scientists have over 40 years of collective experience in performing these type of investigations in all types of habitats.

FACILITIES: Facilities for performing field investigations include two outboard powered research vessels, an 1984 Chevrolet G30 van for sampling and a 32 foot portable laboratory for on-site investigations.

Currently, TAI's taxonomic facilities include separate sorting and identification laboratories as well as a specially built indoor sieve table for size class separations using stacked sieves. Office support includes two secretaries experienced in the input and handling of biological data and ample word processing, data analysis and document production facilities to meet any client needs.

EQUIPMENT: Equipment includes three 2.5X magnification lamps, two Nikon SMZ-1 stereo microscopes with a total magnification of 7 ~ 60X, one Bausch and Lomb StereoZoom 5 with a total magnification of 8 ~ 60X, one Nikon Alphaphot compound microscope with four standard objectives, a Spencer compound microscope with 1X, 4.4X and 9.5X objectives, a Swift inverted microscope with four standard objectives and photoadapter, a Mettler AE163 dual beam balance and a Blue M Model SW-17 TA drying oven.

Other equipment includes 500 micron sieve buckets and stackable sieves for size class separations, ponar and petite ponar grabs, dessicator, procelain and pvc sorting trays and all associated lab supplies such as forceps, shell vials, rapidographs etc. Our library includes a wide variety of taxonomic keys and associated material for tropical, subtropical and temperate macroinvertebrates from freshwater, estuarine and marine habitats.

METHODOLOGY: Field collection of marine, estuarine and freshwater benthic macroinvertebrate samples can utilize a variety of sampling gear. TAI personnel have experience with many types, the most common being Boxcore, Eckman, Petersen, Ponar and Petite ponar grabs, and with Hester-Dendy and other artificial substrate samplers. Bottom sediment type, collection depth and a variety

of other factors, including client specifications, will effect the choice of sampling gear.

Collected samples are sieved using standard 0.5 micron sieve buckets and relaxed using a solution of magnesium sulfate, 2% buffered formalin and seawater, or they are placed on ice. Relaxed samples, and those placed on ice, are preserved with a 10% buffered formalin - rose bengal solution after several hours chilling time. The latter process has proven to be very reliable and is the method of choice. Samples are then returned to the laboratory for processing.

Initial removal of organisms from sediment and debris and separation into major phylogenetic categories is performed by experienced laboratory personnel. Samples undergoing processing are routinely checked by an assigned QAQC referee and/or the Taxonomy Task Manager. QAQC checks occur on no less than 10% of the samples processed.

All identifications are done by experienced taxonomists and checked by our QAQC program. QAQC checks, including secondary identifications and/or comparison of samples to the voucher collection, occur on no less than 10%, randomly chosen, of the samples processed. All identifications and enumerations are recorded on standardized sheets for consistency and ease of data entry. Each sample, upon completion, is recorded in the Daily Taxonomy Log.

TAI's taxonomic team includes in-house and associate taxonomists. TAI maintains in-house expertise in chironomid, polychaete, mollusc, oligochaete, ichthyoplankton, zooplankton, finfishes and local crustacean and echinoderm identifications. Associate taxonomists are used to complement our in-house expertise by providing specialized identifications and performing secondary identifications as part of our QAQC program. Table 1 shows the expertise, education and experience of each member of TAI's benthic macroinvertebrate taxonomy team.

Associate taxonomists to TAI operate under legally binding contracts for services. These documents guarantee the propriety of project information to TAI and our clients. TAI is solely responsible for the performance of its personnel and associate taxonomists.

TAI maintains an extensive voucher collection of freshwater,

estuarine and marine flora and fauna against which identified specimens are verified. The voucher collection is continuously upgraded with new specimens and species. Voucher specimens are currently being recorded on a computer data file for easier location and quicker verifications. This will also be a continously expanding project.

TAI is experienced in wet weight, dry weight and ash weight biomassing. Weighing is performed on a Mettler AE 163 dual beam balance with 0-31g and 0-162g ranges, touch control tare setting, automatic calibration, adjustable time integration and a linearity of 0.02 mg and 0.1 mg on the respective ranges.

Data entry is facilitated by the use of standardized sheets for recording the identification, enumeration and biomass of each sample. A visual check of all data is performed by an experienced referee or by the Taxonomy Task Manager to assure completeness and accuracy of the data.

TAI uses a comprehensive QAQC program to assure accuracy and completeness of processing, identifications, data analysis and reporting. The major elements of this plan are presented in detail in agency approved QAQC plans and include corporate experience, taxonomy task manager, experienced taxonomists, voucher collection, referee taxonomists, frequent data audits, sample tracking sheets, daily log sheets, standardized forms, and sample curation.

PRODUCTS:

Preliminary statistical reports of the data are utilized (both tabular and graphical methods) to check the data for completeness, and to screen out questionable information. Simple descriptive statistics (Mean, Range, Standard Deviation) of data is performed with the Symphony (T.M.) software system.

TAI can produce a number of analyses that present benthic invertebrate data by trophic type, abundance, ranked in order of abundance, diversity and cluster analysis. Examples of these analyses, presented as tables and figures, are included as Appendix B. These, or additional analyses, are included as per client needs.

A cluster analysis package which runs on the IBM-PC has been developed by TAI. It is capable of analysis a 250 x 250 species/station matrix and provides up to 12 similarity indices. The program has provisions for various standardizations, transformations and for both normal (Q) and inverse (r) mode analyses. Generally, the Bray-Curtis and/or Morisita indices are used for routine benthic analyses.

Additionally, TAI has experience in preparing customized symphony

and Lotus 1-2-3 worksheets for biological data for governmental clients and private consulting organizations. We are thoroughly familiar with developing macros for the Lotus System to perform data summaries and preparing specialized statistics such as diversity and similarity, indices, and for outputting data for further statistical analysis.

3.0 PERSONNEL AND AVAILABLE STAFF

PERSONNEL AND AVAILABLE STAFF

TAI's staff currently consists of five scientists, three technicians, and two clerical personnel each thoroughly familiar with various aspects of our specialized services. In addition, Associate personnel including Taxonomic experts and computer personnel specializing in data management and statistical analysis complete the team of specialists ready to provide quality controlled - cost effective services to Government and Corporate clients.

TAI Environmental Sciences Inc.

Key Personnel	Areas of Specialization
Eldon C. Blancher, Ph.D.	Administration, Zooplankton Taxonomy, Chemistry, Data Management, Computer Modeling, Data Presentation.
Charles E. Tucker, B.S.	Project Management, Bioassay and Toxicity Testing, Environmental surveys, Sediment Analysis.
H. Devin Dedeaux, B.S.	Field and Equipment Manager, Vessel Operations, Field Collection.
Vicki Spence	Bioassay and Toxicity Testing, Freshwater Benthic Taxonomy.
Yolanda Turner	Bioassay and Chemical Analaysis.
Mark Rotch	Bioassay and Aquaculture.
Robert Allen	Data Manager, Statistics, Systems Analysis.
John Valentine, M.S.	Polychaete, Crustacean, Echinoderm and Freshwater Invertebrate Taxonomist, Associate.
Michael R. Dardeau, M.S.	Fish Ecology and Taxonomy, Epibenthic Invertebrate Taxonomy, Fisheries Biology, Statistics, Associate.
Douglas K. Gilbert, M.S.	Benthic Ecology, Invertebrate Taxonomy, Live Bottom Studies, Water Quality, Sediment Chemistry, Associate.
Edward J. Carpenter, Ph.D.	Phytoplankton Ecology, Physiology, and Taxonomy, Associate.
Linda E. Duguay, Ph.D.	Phytoplankton and Periphyton Taxonomy, Associate.
Richard Heard, Ph.D.	Crustacean and Epibenthic Invertebrate Taxonomy, Associate.

Eldon C. Blancher II, President

TAI Environmental Sciences, Inc.

Ph.D. Environmental Engineering Sciences, University of Florida - 1979
M.S. Zoology, Louisiana State University - 1974
B.A. Biological Sciences, University of New Orleans - 1972

Dr. Blancher is an expert in the field of estuarine systems ecology, and computer analysis and modeling of marine and aquatic systems. He has planned and managed all aspects of two large-scale Environmental Assessments (EA) to assess the impacts of thin-layer dredged material disposal on estuarine systems using sediment profiling techniques. he also managed sediment profile field operations of two smaller studies of Mound disposal in the Gulf of Mexico. He managed U.S. Army Corps of Engineers baseline studies of Mobile Bay and Mississippi Sound and also an EA to evaluate impacts associated with the development and operation (including island development) of the Theodore Ship Channel in Alabama. he also conducted several large-scale benthic evaluations for oil lease sites and estuarine channelization projects and has directed the ecological characterization for four EA's prepared for Gulf and Atlantic Ocean dredged material sites.

Dr. Blancher's experience in computer analysis of ecological systems range from the development of complex algorithms for the Waterways Experiment Station's ecological modeling group to development of a commercially available multivariate statistical program for ecological analysis (CLUSTER-PC). He has applied state-of-the-art data management techniques on ecological systems data since 1976.

4.0 CORPORATE EXPERIENCE

TAI Environmental Sciences Inc.

CORPORATE EXPERIENCE

DATA MANAGEMENT, MODELING AND STATISTICS

Data Management

Data Management for Monitoring and Assessing the Effects of Thin - layer Dredged Material Disposal on an Estuarine Environment, Fowl River, Alabama. Corps of Engineers Mobile District, Mobile, Alabama. (1986)

Data Management for Determination of Loading Rates for Seafood Wastes in a Salt Marsh. Marine Environmental Sciences Consortium. Dauphin Island, Alabama. (1985-86)

Systems Design, Alabama Advisory Service - Sea Grant. Sea Grant Advisory Services Office, Mobile, Alabama. (1985-86)

Landuse Survey Data Management System. Baldwin County Commission, Baldwin County, Alabama. (1984-86)

Design and Implementation of Data Management System, Environmental Laboratory - Habitat Monitoring Group, Corps of Engineers Waterways Experiment Station. Vicksburg, Mississippi. (1985)

Data Management System for the Coastal Permit Process. Baldwin County Commission, Baldwin County, Alabama. (1984-85)

Construction and Implementation of an Environmental Data Base for Sea Grant Consortium, Mississippi - Alabama. (1982-85)

Data Management System, Tenn - Tom Fish Study. Boschung and Associates, Tuscaloosa, Alabama. (1984)

Data Base Construction and Implementation for Theodore Disposal Island Study, Mobile Bay, Alabama. Subcontract to MESC. (1979-82)

Data Base Management for the Coastal Area Board, Mobile Bay, Alabama. (1980-81)

Systems Design and RJE Implementation. Marine Environmental Sciences Consortium. Dauphin Island, Alabama. (1979-80)

Modelling

Stormwater Runoff Modelling for Several Lakes on the Naval Submarine Support Base, Kings Bay, Georgia. (1985)

Bay County Mixing Zone Modelling Study, Panama City, Florida. (1985)

Ecological Systems and Water Quality Modelling, Lake Conway Project. Environmental Laboratory - Ecological Modelling Group. Corps of Engineers Waterways Experiment Station. Vicksburg, Mississippi. (1978-82)

Nutrient Loading Modelling for Lake Okeechobee, Florida. (1978-79)

Statistical Analysis

Statistical Analysis Plan for Eau Galle Lake, Wisconsin, Corps of Engingeers Waterways Experiment Station, Vicksburg, Mississippi. (1986)

Statistical Analysis for Seafood Waste Project. Marine Environmental Sciences Consortium, Dauphin Island, Alabama. (1985- 86)

Statistical Analysis Plan for Endangered Mussel Research, Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
(1985)

Statistical Analysis of Biological Data, Key West Project (Benthic macroinvertebrates) CH2M Hill Inc., Gainesville, Florida. (1984)

Statistical Analysis of Ecological and Biological Data, Lake Conway Project. Environmental Laboratory - Ecological Modelling Group, Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi. (1978-82)

Assisted in Development of Macrophyte Algorithm for CE - QUAL 1, Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi. (1980)

Seminars

Seminars on the Use of Advanced Lotus 1-2-3, Entre Computers, Mobile, Alabama. (1985-86)

Seminars on the use of Advanced Symphony, Entre Computers, Mobile, Alabama. (1985-86)

Seminars on the Use of Advanced dBASE II, Entre Computers, Mobile, Alabama. (1985-86)

Seminars on the Use of Statistical Analysis Systems (SAS). University of South Alabama, Mobile, Alabama. (1985)

TAI ENVIRONMENTAL SCIENCES, INC.

CORPORATE EXPERIENCE

TOXICOLOGY AND BIOASSAY SERVICES

Accelerated testing program utilizing short term chronic bioassays for a metal plating factory. Herber Springs, Arkansas. (1988-90).

Definitive Toxicity Testing of Chemical effluents. North Mobile County. (1988-90)

Quarterly Short-Term Chronic Bioassays of Industrial effluents from a plastics processing plant. Aberdeen, MS. (1988-90)

Biannual Short-Term Chronic Bioassays of Industrial and Chemical effluents. Bucks, AL. (1988-90)

Monthly Definitive Tests (LC50) Bioassays of Industrial and Chemical effluents. Bucks, AL. (1988-90)

Monthly Definitive Test (LC50) Bioassays of Industrial effluents. Axis, AL. (1988-90)

Biannual Short-Term Chronic Bioassays of Chemical effluents. Aberdeen, MS. (1987-90)

Monthly Definitive Tests (LC50) Bioassays of Chemical effluents. Axis, AL. (1988-90)

Biomonthly Acute Screening Test Bioassays of Pre and Post Chlorinated municipal waste water. Marianna, FL. (1988-90)

Definitive Test (LC50) Bioassays of Industrial Pilot-plant effluents. Industrial Park, Theodore, AL. (1988-89)

Definitive Test (LC50) Bioassays of Oil Refinery Storm Water Run-off effluents. Saraland, AL. (1988-89)

Definitive Test (LC50) Bioassays of municipal wastewater. Graceville,

FL. (1987-88)

Definitive Test (LC50) Bioassays of wastewater. Lynn Haven, FL. (1986-88)

Definitive Test (LC50) Bioassays of Paper Pulp effluents. Subcontract from P.E. LaMoreaux and Associates. (1986)

SPECIFIC TOXICOLOGY EXPERIENCE
UTILIZING THE SPECIES
Mysidopsis bahia

Law Environmental, 96 hr. Acute and 7-day Chronic tests on Industrial Effluent on *Mysidopsis bahia*, *Cyprinodon variegatus* and *Champia parvula*. (1988-present)

Envirosphere Company, Produced water (Cook Inlet Alaska) acute bioassays using *Mysidopsis bahia*. (1988-present)

Coca Cola Foods, 96 hr. Acute tests on Industrial Effluent using *Mysidopsis bahia* and *Menidia beryllina*. (1988-present)

City of Miami Florida-Dade County, FL. (Subcontract from ESE) 96-hr. Acute Definitive Toxicity Tests of Municipal Effluent. (1987 - 1988)

Dupont Corporation, (Subcontract from ESE), 96-hr. Acute *Mysidopsis bahia* Definitive Toxicity Tests of Industrial Effluent. (1987)

Amoco Oil Corporation, (Subcontract from ESE) 96-hr. Acute *Mysidopsis* Definitive Toxicity Tests of Drilling Fluid. (1987-88)

U.S. Navy, (Subcontract from Jordon, Jones and Goulding) 96-hr. *Mysidopsis* and *Cyprinodon* Acute Definitive Toxicity Tests of Fuel Depot Storm Water. (1987)

Round-Robin drill mud Acute *Mysidopsis* toxicity tests. Biom Sea Lab, Pensacola, Florida. (1988)

Offshore Operators Committee (OOC), 96-hr. Acute *Mysidopsis* Definitive Toxicity Tests of Experimental Drilling Fluids. (1987)

Gardinier Corporation, (Subcontract from ESE) 96-hr. Acute *Mysidopsis* Definitive Toxicity Tests of Industrial Effluents. (1987)

Chevron Oil, 96-hr. Acute Definitive *Mysidopsis* Toxicity Tests of Drilling Fluids. (1987)

Degussa Corporation, 96-hr. Acute Definitive Tests and 7-Day *Mysidopsis* and *Cyprinodon* Chronic Tests of High Saline (Potassium Salts) Industrial Pilot Plant Effluents. (1985-86)

TAI TIE/TRE RELATED PROJECT EXPERIENCE

Trinova Corporation, Herber Springs, Arkansas

TAI analyzed the toxicity of effluents from an industrial metal plating facility at Trinvova's Arkansas facility. These effluent characterizations included EDTA chelation tests which indicated a significant contribution by heavy metals to the effluents toxicity. Further analytical and toxicological characterization clearly identified Chromium as the primary toxicant. Additional bioassay testing with a "synthetic" wastewater matrix gave insight into treatment options and the synergistic and antagonistic effects of other wastewater components.

City of Marianna, Marianna, Florida

The City of Marianna experienced sporadic toxicity over a period of several years. Through a variety of studies, this toxicity was shown to be non-persistent and passed untreated through their older trickling filter treatment system. It was also shown that removal was achieved in the oxidation ditch system. Indications during initial toxicity identification evaluations (TIE) has shown that operational adjustments may alleviate the toxicity. Further characterization is awaiting additional testing which would demonstrate the effectiveness of operational controls, thereby avoiding more costly remediation measures.

M&T Chemicals, Inc., Mobile, Alabama

TAI has performed a variety of tests within the Phase I characterization procedures for this client. These characterization and treatability tests include the EPA procedures for oxidation-reduction, pH adjustments, filtration, aeration, and C-18 separatory characterization of major organic products based on their polar properties. These procedures identified several avenues for further treatability testing. This information was used, along with UDKHDEN zone of initial dilution (ZID) modeling, probabilistic modeling techniques, and dye isopleth studies, to determine potential level of treatment necessary for assuring compliance with increased regulatory requirements anticipated in the future.

Evans Industries, Harvey, Louisiana

TAI performed a series of TIE/TRE analyses for this client in order to elucidate the corrective actions necessary to achieve compliance under their NPDEs permit. The studies included the identification of non-persistent surfactants and investigated the effectiveness of aeration and oxidant addition in alleviating the problem. Continued studies are underway as this project moves into the treatability phase.

Freeport McMoRan, Indonesia

TAI performed an abbreviated series of TIE/TRE analysis for this client in order to evaluate alternative methods for treatment of mine refuse. Effluent manipulation included both liquid and solid phase constituents. The effectiveness of aeration, filtration, C18 filtration, and EDTA chelation procedures were implemented to assess the effectiveness of the proposed treatment system.

Hoechst Celanese, Mobile, Alabama

Toxicity characterization for this organic chemical manufacturer included a variety of Phase I tests such as pH adjustments, oxidation-reduction testing, and continuous aeration. These procedures were used to assess the effectiveness of these control measures on the facilities' effluent and an indication of the major toxic component.

Arkansas Eastman, Arkansas

TAI is currently performing preliminary TIE evaluations of wastewater for several waste streams from this organic manufacturing facility. The investigation is primarily focused on ammonia toxicity and TAI is performing various ammonia toxicity confirmation procedures including pH shifting, non-ionized ammonia testing, species sensitivity and zeolite testing.

Tennesee Eastman, Kingsport, Tennessee

TAI is also performing a similar TIE evaluation at this facility in parallel to the tests performed at this clients Arkansas Facility.

Coca Cola Foodservices Group, Dunedin, Florida

An initial TIE screening is being performed to evaluate the potential of metal and/or organic chemical toxicity for this facility. Currently the EDTA chelation and C-18 TIE procedures are being performed in order to plan a more definitive TIE study in the future.

ADDITIONAL EXPERIENCE

Westvaco Chemical Company, Deridder, Louisiana

TAI currently conducts quarterly NPDES monitoring at this facility using the species Ceriodaphnia dubia and Pimephales promelas.

Jefferson Parish Environmental Control Department, Metairie, Louisiana

TAI conducted whole-effluent toxicity testing on the discharge from a barrel manufacturing company located in south Louisiana. The testing, which was required under a Louisiana Department of Environmental Quality TRE order, consisted of toxicity characterization and identification. The results of this testing indicated unacceptably high mortality caused by surfactants used in the barrel cleaning operation. Based on the toxicity identification performed by TAI, biological treatment was recommended for the bench-scale treatability study.

Plaquemine Parish, Belle Chasse, Louisiana

TAI has been involved in providing toxicological services for waste treatment facilities of Plaquemine Parish. This study is designed to examine and determine toxicological variability at three discharge sites. Work with this client includes acute and chronic toxicity testing.

Orleans Parish, New Orleans, Louisiana

TAI is currently providing toxicological services to the Orleans waste treatment facility. These services include chronic bioassays on a regular basis as part of the clients biomonitoring program.

Jefferson Parish, Metairie, Louisiana

TAI is currently providing toxicological services to the Jefferson Parish waste treatment facility. These services include chronic bioassays on a regular basis as part of the clients biomonitoring program.

TAI ENVIRONMENTAL SCIENCES, INC.

CORPORATE EXPERIENCE

ENVIRONMENTAL MONITORING AND ECOLOGY

ENVIRONMENTAL IMPACT ASSESSMENT, THEODORE SHIP CHANNEL, ALABAMA

This program was conducted to assess dredging and operational impacts of the Theodore Ship Channel on the Alabama coastal environment. TAI scientists developed and managed a comprehensive data base for this project and provided environmental impact evaluations and management recommendations. U.S. Army COE, Mobile District.

ENVIRONMENTAL MONITORING, MOBILE BAY/MISSISSIPPI SOUND, ALABAMA

The objective of this project was to establish a biological and water quality baseline for more than 225 square miles of dynamic coastal estuary. This baseline would be used for the overall assessment of the environmental effects of future development on Mobile Bay and Mississippi Sound including the Mobile Ship Channel and its maintenance. TAI scientists developed and implemented a data base management program for the study and provided statistical analyses, data interpretation and evaluation, and management recommendations. Alabama Coastal Area Board.

ENVIRONMENTAL ASSESSMENT SUPPORT SERVICES, TENNESSEE - TOMBIGBEE WATERWAY, MISSISSIPPI/ALABAMA

Since 1979, TAI has been involved with the assessment of impacts resulting from the construction of the Tennessee- Tombigbee Waterway. TAI has contributed to several biological studies of natural waters affected by channelization. U.S. Army COE, Mobile District.

THIN-LAYER DREDGED MATERIAL DISPOSAL MONITORING, FOWL RIVER, ALABAMA

TAI and ESE scientists recently performed an impact assessment for the Fowl River thin-layer dredged material disposal project. Work included the evaluation of impacts of this new disposal technique to bathymetry, water quality, macroinvertebrate communities, and fishery resources at a disposal area in lower Mobile Bay. Emphasis was also placed on the physical, chemical and biological changes within the Fowl River Channel that bisected the study area. Evaluation techniques included extensive Sediment Profile Imaging. U.S. Army COE, Mobile District.

THIN-LAYER DREDGED MATERIAL DISPOSAL MONITORING, GULFPORT HARBOR, MISSISSIPPI

TAI is currently is working with ESE to assess the overall impacts of thin-layer dredged material disposal. This environmental assessment (EA) includes detailed bathymetric and water quality analyses, sediment profile imaging, and the evaluation of disposal impacts on macroinvertebrate communities and fisheries resources. U.S. Army COE, Mobile District.

BIOLOGICAL ASSESSMENT, LAKE ROUSSEAU, FLORIDA

This project involved the characterization of phytoplankton, zooplankton, and icthyoplankton communities of Lake Rousseau, a proposed site of power plant cooling water. Environmental Science and Engineering, Inc.

RADIOLOGICAL MONITORING, KINGS BAY, GEORGIA.

TAI scientists annually collect biological samples from the NSB vicinity for radiological analysis by the Department of Energy. Knolls Atomic Power Laboratory.

STORMWATER LAKES MODELING, ST. MARY'S GEORGIA

TAI scientists recently performed a stormwater loading assessments, stormwater modeling, and trophic state analyses for several lakes on the Naval Submarine Base, Kings Bay, Georgia for a Navy contractor. A Best Management Practices (BMP) plan also was developed. Jones, Edmunds and Assoc. Inc.

BENTHIC COMMUNITY ANALYSIS, KEY WEST, FLORIDA

For this project, TAI analyzed and described benthic invertebrate communities on natural and artificial substrates to determine the extent and degree of impact resulting from power plant discharge. CH2M Hill, Southeast.

ENVIRONMENTAL IMPACT ASSESSMENT, CHARLOTTE HARBOR, FORT PIERCE AND MIAMI, FLORIDA

TAI has performed the identification of benthic macroinvertebrates collected during an extensive sampling program of ocean-dredged material disposal sites. Conservation Consultants, Inc.

ENVIRONMENTAL ASSESSMENT, FT. MYERS, FLORIDA

TAI has characterized benthic communities to establish a monitoring baseline for an ocean-dredged material disposal site located off Ft. Myers Beach. Conservation Consultants, Inc.

ENVIRONMENTAL IMPACT ASSESSMENT, PASCO COUNTY, FLORIDA

This project involved the assessment of potential impacts of wastewater discharge into a salt marsh estuary on Florida's west coast. Three of TAI's project team members took part in this project. Their roles included overall project management, the assessment of aquatic biological communities, water quality evaluation, vegetation mapping, regulatory negotiation, and the development of management recommendations.

DREDGE AND FILL COMPLIANCE MONITORING, SATELLITE BEACH, FLORIDA

This program was designed to monitor the potential impacts of dredging and construction associated with large-scale development on the environmentally sensitive Indian River estuary. Koblar Construction.

WATER QUALITY ANALYSIS

TAI developed a water quality baseline in conjunction with proposed dredging and facility expansion activities at Coast Guard bases in Pensacola and Destin, Florida and at Port Isabel, Texas. U.S. Coast Guard, 8th District.

ENVIRONMENTAL MONITORING SUPPORT SERVICES, AMUAY BAY, VENEZUELA

TAI scientists analyzed plankton, epibenthic invertebrate, and fish samples collected from the vicinity of a coastal oil terminal. Biological characterizations and impact assessments were provided based on this data. AWARE, Inc.

SALTWATER WETLAND UTILIZATION

TAI, in conjunction with the University system of Alabama, has conducted a demonstration project to assess the potential for a salt marsh system to renovate wastewaters. This pilot project, the first to be funded under EPA Region IV's Saltwater Wetland EIS, assessed treatment efficiency, developed loading rates, and evaluated impacts to the salt marsh system and adjacent waters. Environmental Protection Agency.

ENVIRONMENTAL ASSESSMENT, LAKE WORTH ESTUARY, FLORIDA

This project was conducted to assess the impacts of a coastal development on estuarine Lake Worth and adjacent impounded waters. This program included water quality surveys, assessment of aquatic biological communities, an ecological inventory, and the mapping of upland and submergent vegetation. Patton & Associates, Inc.

WATER QUALITY MONITORING/DREDGE DISPOSAL AREA PERMITTING, MELBOURNE HARBOR, FLORIDA

TAI scientists conducted water quality monitoring for this project in compliance with EPA, COE and FDER regulations. A hazardous waste determination also was performed for dredge spoil from the study site. TAI conducted negotiations and obtained site closure and spoil relocation permits.

DATA BASE MANAGEMENT, LAKE CONWAY, FLORIDA

TAI provided the COE with a data base management system and statistical support to aid in its comprehensive evaluation of the effectiveness and environmental impacts associated with biological macrophyte control strategies. Waterways Experiment Station, Vicksbury, MS.

TAI Environmental Sciences Inc.

CORPORATE EXPERIENCE

BENTHIC MACROINFAUNA TAXONOMY

Baseline characterization of the macroinvertebrate community for assessing the effects of thin-layer dredge disposal on an estuarine environment. Fowl River, Alabama. (1986-88).

Baseline pre-disposal characterization of the benthic invertebrate community of several ocean disposal sites. Charlotte Harbor, Fort Pierce and Miami, Florida. (1986-89).

Benthic characterization for evaluation of potential impacts resulting from construction, development and initial operation of Navy homeports in the Gulf of Mexico. Pensacola Bay, Florida. (1986).

Characterization of benthic communities within natural and man-made embayments in Charlotte Harbor, Florida. (1986).

Characterization of the benthic community collected by core sampling in the Waccamaw River floodplain, South Carolina. (1986).

Identification and analysis of benthic invertebrates collected in estuarine and salt marsh areas of the Northern Gulf of Mexico. (1989).

Identificcation and characterization of benthic invertebrates collected on artificial substrates. Key West, Florida. (1986).

Characterization of the benthic community, both pre and post-discharge, in a freshwater wetlands area. Pasco County, Florida. (1985-Present).

Identification and analysis of the benthic invertebrates of St. John's Harbor, Florida. (1985-Present).

Identification of a freshwater benthic community from Pottsburg Creek, Florida. (1982-Present)

Baseline characterization and monitoring of the benthic fauna of Mobile Bay, Alabama. (1980-1982).

Analysis of benthic invertebrates collected from the Wando River, South Carolina. (1981-82; 1989-90).

Benthic survey of MOEPSI dumpsite tract. Coastal Alabama. (1981).

Bioassays and toxicity testing of benthic invertebrates collected at numerous sites along the South Atlantic and Gulf coasts. (1978-1990).

Analysis of benthic invertebrate samples collected on BLM- MAFLA cruises. Eastern Gulf of Mexico. (1979-1980).

Baseline characterization of the benthic invertebrate community of an EPA designated ocean disposal site. Wilmington Harbor, North Carolina. (1979).

Characterization of the benthic community and assessment of impacts resulting from construction, development, and initial operation. Naval Submarine support Base, Kings Bay, Georgia. (1978-1979).

Benthic characterization and evaluation of potential impacts for an EIS for power plant expansion. Crystal River, Florida. (1977-1978).

Characterization of benthic invertebrate communities in coastal Mississippi, Alabama, and Florida (MAFLA) lease areas. (1976-1978).

Analysis of benthic invertebrates in the vicinity of a pulp and paper plant. Apalachicola Bay, Florida. (1977).

Establishment of a benthic invertebrate reference collection. Eastern Gulf of Mexico. (1976-1977).

Design of baseline benthic studies for the South Atlantic OCS program. (1976).

Benthic surveys of MAFLA lease areas. Eastern Gulf of Mexico. (1975-1976).

Characterization of benthic invertebrate communities of coastal Louisiana for the Environmental Impact Statement (EIS) for the Gulf Intracoastal Waterway. (1975).

Analysis of benthic invertebrate community structure and assessment of impacts resulting from maintenance dredging. Gulfport, Mississippi. (1974).

Characterization and delineation of subtidal and intertidal invertebrate communities. Coastal North Carolina. (1970- 1974).

Survey of the epibenthic fauna of the Hudson Canyon. North Atlantic Ocean. (1973).

Analysis of benthic invertebrate samples collected from various sites in the Florida Keys. (1973).

Characterization of the benthos of a high energy beach. Coastal North Carolina. (1973).

Characterization of the benthos of a high energy beach system. Yorkshire Coast, England. (1972).

Survey of benthic invertebrates of the North Carolina outer continental shelf. (1972).

Studies on the physiology of benthic estuarine organisms. Florida. (1971-1982)

Characterization of the subtidal and intertidal benthos of Puget Sound, Washington. (1971).

Characterization of benthic communities of the Gulf of California. (1971).

5.0 FACILITIES

FACILITIES AND EQUIPMENT

TAI Environmental Sciences Inc. is currently located at 1717 Old Shell Road, Mobile, Alabama in a modern 4000 square foot office/laboratory building which houses corporate offices, laboratories and storage facilities. A mobile 32-foot laboratory is available for performing on-site investigations. Additional facilities include a van for field operations, two 20-ft sampling vessels and all necessary field equipment for performing environmental investigations.

Available equipment for laboratory and field investigations as well as computational facilities are described in the following tables. Additional Equipment is available from rental agencies and is acquired on an as-needed basis.

Computers and Data Processing Equipment

Personal Computers

1 - IBM/XT 640 k w/ 20 meg Disk Drive
1 - ALR System 286 1000k w/ 80 meg Disk and NEC Multisync Monitor
1 - IBM Portable 640k w/ 40 meg Disk
1 - Hyundai Turbo 640 k w/40 meg drive

Peripheral Equipment

1 - Cipher series 9000 9-track tape drive
1 - Hewlett-Packard 7470A Plotter
1 - Summagraphics MM1218 Professional Digitizer
1 - Phillips CD-ROM Reader
1 - Hewlett-Packard DeskJet Printer
1 - Epson LQ2500 Printer
2 - NEC 8023A Dot-Matrix Printers
2 - Hayes 1200 Baud Modems

Other

1 - Chorus 1500 Image Capture Board with 768X560 resolution and high resolution (1024X560) Mitsubishi RGB monitor

Computer Account with University of South Alabama for mainframe (IBM 3081) utilization.

METERS

TYPE	MODEL	MANUFACTURER
Portable pH Meter	#610A	Corning Scientific Instruments
Portable Oxygen Meter	#57	Yellow Springs Instrument Co., Inc. (YSI)
Portable S-C-T Meter	#33	Yellow Springs Instrument Co., Inc. (YSI)
Thermometer		VWR Scientific, Inc.
Portable pH Meter	SA 210	Orion
Portable Oxygen Meter	SL9	Orion
Ammonia Electrode	95-12	Orion
Residual Chlorine Electrode	977000	Orion

FIELD EQUIPMENT

Sediment Profile Camera
equiped with a Minolta 8mm video camera

Ponar Grab

Kemmerer Sampler

16-ft Otter Trawls

Bag Seine Net

Laboratory Instruments

Type	Model	Manufacturer
Analytical Balance	AE 163	Mettler
Environmental Chamber	RI-50-555-A	Revco
Spectrophotometer	DR 2000	Hach
Digital Titrator	16900-01	Hach
Stirrers	CMS 244-793	Curtin Matheson
Microscope(stereo)	SMZ-1	Nikon
Microscope(cmpd)	Alphaphot YS	Nikon
Microscope(cmpd)	30	Spencer
Microscope(inverted)		Bausch & Lomb
pH Meter	SA-210	Orion
pH Meter	610	Corning
Ionanlyser	407 A	Orion
Shaker Table	3520	Lab Line
D.O. Meter	SL 9	Orion
D.O. Meter	57	YSI
S-C-T Meter	33	YSI
Light Meters	Luna Lux	Gossen

APPENDIX

TAI ENVIRONMENTAL SCIENCES, INC.

1717 OLD SHELL ROAD MOBILE, ALABAMA 36604 (205) 479-0394

PERSONNEL QUALIFICATIONS

ELDON C. BLANCHER, PH.D.
TAI Environmental Sciences, Inc.

Areas of Specialization:

Project Management, Data Management, Computer Modeling, Systems Ecology, Environmental Chemistry, Impact Assessment.

Education:

B.S. University of New Orleans, 1972
M.S. Louisiana State University, 1974
Ph.D University of Florida, 1979
Post Doctoral Fellowship, University of Florida, 1979

Relevant Project Experience:

President, TAI Environmental Sciences, Inc., Mobile, Alabama, 1977-to present-- Responsible for corporate performance for government and industrial clients. Senior scientist performing general project management, data interpretation and reporting.

Project Manager. Mixing Zone Analysis. Responsible for project management, data collection, data processing and reporting of isopleth data using Rhodamine WT dye to determine outfall mixing zone, concentration. This was combined with further environmental assessments to give a comprehensive mixing zone analysis. (1988-90)

Project Manager. Water Resource Study. Ongoing analysis of municipal and industrial effluent discharge into the streams of the Tombigbee-Black Warrior River Basins. U.S. COE, Mobile District, Mobile, Alabama. (1987-88)

Project Manager. Collection and reporting for corrosion study on samples placed in nearshore shallow-water areas in the Florida Keys. (1986)

Project Manager. Assessment of Stormwater Lake Systems, Kings Bay Naval Base, St. Mary's, Georgia. Determined stormwater loadings and modeled various water quality parameters. (1985)

Project Manager. Environmental Impact Assessment. Responsible for subcontractor negotiations and overall management of extensive study for Monitoring Environmental Impacts Associated with Open-Water Thin-Layer Disposal of New Work Dredged Material at Gulfport Harbor, Mississip (1986-88)

Environmental Assessment. Evaluation of the impacts of agricultural runoff of Lake Okeechobee, Florida. (1978-79)

Characterization of the plankton communities of six estuaries in support of area wide 208 water management planning. Southwest Florida. (1977-78)

Characterization and sensitivity analysis of aquatic communities at a proposed source of power plant cooling water. Lake Rousseau, Florida. (1977)

Estuarine fish surveys. Coastal Louisiana. (1973-74)

Survey of the fish and epibenthic fauna of Hudson Canyon, North Atlantic Ocean. (1973)

Professional Societies

Society of Environmental Toxicology and Chemistry
American Society of Limnology and Oceanography
International Society of Ecological Modeling
Water Pollution Control Federation
Florida Academy of Sciences
Louisiana Academy of Sciences
American Association for the Advancement of Sciences

Publications:

Blancher, E.C. 1984. Zooplankton Trophic State Relationships in Some North and Central Florida Lakes. Hydrobiologia 109:251-263.

Blancher, E.C. 1983. An Information Management System for the Mississippi-Alabama Coastal Zone: Design and Implementation. Proceedings of the ASCE Coastal Zone 83 Conference. June 1983, San Diego, California.

Blancher, E. C. 1982. Application of Existing Data Management Systems to compute and document Various Data Elements for the Mississippi Sound and Adjacent Areas Study. Final Report to U.S. Army Corps of Engineers, Mobile District. Contract DACQ-82-M-9911.

Blancher, E. C. 1982. Establishing a Biological Benchmark for Mobile Bay: Rationale Methods and Progress. Final Report to the Alabama Coastal Area Board.

Blancher, E. C. and C. G. Buglewicz. 1982. Large Scale Operations Management Test of use of the white Amur for Control of Aquatic Plants; Report 1, Baseline Studies; Vol. VII Summary of Baseline Studies and Data. U.S. Army Engineer Waterways Experiment Station. Tech. Report A-78-2 Vol. VII.

Blancher E. C. 1982. A Description of the Marine Environmental Sciences Consortium Data Management System. Dauphin Island Sea Lab Technical Report 82-002.

Project Manager. Responsible for overall management, budget, scheduling and reporting for Monitoring Environmental Impacts Associated with Thin-Layer Open-Water Disposal of Dredge Material at Fowl River, Alabama. (1986-88)

Project Manager. Water quality survey of Coast Guard Stations, Destin and Pensacola, Florida and Port Isabel, Texas. (1985-86)

Project Manager. Coastal Land Use Compilation for the Baldwin County, Alabama Coast. Included a sewer and water survey and design of the permit process for county administrators. (1984)

Principal Investigator. Compilation of biological and chemical data for Mississippi and Alabama Coastal Area and designed a data management system for use by environmental planners. (1983-84)

Project Scientist. Assessment of impacts to aquatic biological systems resulting from the construction of the Tennessee-Tombigbee Waterway. Baseline characterization, data management, assessment of impacts to fishery resources. Mississippi and Alabama. (1979-83)

Consultants to Sea Grant Advisory Service. Biological Advisory Committee for Mobile District COE. (1981-83)

Project Manager. Assessment of impacts associated with the dredging and operation of the Theodore Ship Channel. Data management, statistical analyses, impact assessment, Mobile, Bay, Alabama. (1979-82)

Analysis of zooplankton community structure in a series of hydropower reservoirs. Coosa River, Georgia and Alabama. (1980-81)

Project Scientist. Evaluation of biological strategies for macrophyte control. Ecological modeling, development of a hydrologic-nutrient systems models, data management. Lake Conway, Florida. (1978-82)

Project Manager. Comprehensive environmental monitoring and assessment of environmental monitoring and assessment of environmental sensitivity. Broad-based characterization of estuarine water quality, plankton, benthos, sediments, and fishery resources. Biological analysis, data management, evaluation, management recommendations. Mobile Bay-Mississippi Sound. Principal Investigator. Development of a plan of study for the utilization of a salt marsh system for the treatment of seafood wastes. Alabama. (1979-81)

Quality control manager for the taxonomic analysis of biota collected from the St. John's River, Florida. (1980)

Characterization of the zooplankton community of Lake Lanier and Lake Seminole, Georgia. (1978-79)

Blancher, E.C. 1981. Data Management Systems for the Theodore Channel Project. Report to U.S. Army Corps of Engineers, Mobile District.

Blancher, E.C. 1980. Data Management Systems for the Large Scale Operations Management Test at Lake Conway. Final Report. U.S. Corps of Engineers Waterways Experiment Station. Misc. Paper. (In Press).

Blancher, E.C. 1980. Impact of Stormwater Runoff on a Florida Lake Ecosystem: Effects on Water Quality and Biota. U.S. EPA Conference Proceedings. Municipal Environmental Research Laboratory, Cincinnati EPA 600/9-80-056.

Blancher, E.C. and C. R. Fellows. 1980. Nitrogen and Phosphorus Dynamics of the Lake Conway Ecosystem: Loading Budgets and a Dynamic Hydrologic-Phosphorus Model. Final Report to U.S. Army Corps of Engineers Waterways Experiment Station. (In Press).

Brezonik, P.L., E.C. Blancher and V.B. Myers. 1979. Factors Affecting Primary Productivity in Lake Okeechobee, Florida. Final Report to the Florida Sugar Cane League. Dept. of Env. Eng., Univ. of Flo Gainesville, Florida 07-70-01.

Conley, R.A., E.C. Blancher and F. Kooijman. 1978. Biological Baseline Studies of the Lake Conway, Florida, System. Second Annual Report to the Waterways Experimental Station. U.S. Army Corps of Engineers. Tech. Report A-78-2 Vol. III.

Blancher, E.C. and C.R. Fellows. 1978. Nitrogen and Phosphorus Loading Characteristics of the Lake Conway, Florida, Ecosystem. Preliminary Report to the Waterways Experiment Station, U.S. Army Corps of Engineers. Tech. Report A-78-2 Vol. IV.

TAI ENVIRONMENTAL SCIENCES, INC.

1717 OLD SHELL ROAD MOBILE, ALABAMA 36604 (205) 479-0394

CHARLES E. TUCKER
TAI Environmental Sciences, Inc.

Areas of Specialization

Biological and Environmental Monitoring, Aquaculture, Estuarine Ecology, and Sediment Analysis.

Education

Livingston University (Livingston, AL)
B.S.: Biology
1982

University of South Alabama (Mobile, AL)
Graduate Study in Biology
1984-85

Current Position and Responsibilities

Area Manager, (Biomonitoring and Aquaculture). Responsible for personnel and activities associated with in-house stock cultures and bioassay testing, including quality control, marketing, and systems design. (1986-90)

Relevant Project Experience

Biomonitoring Experience

Project Manager. Bioassay Testing and Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for continuing Monthly Definitive Tests (LC50) Bioassays of Chemical Effluents. Bucks, AL. (1986-90)

Project Manager. Bioassay Testing and Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for Screening Toxicity Testing of Paper Pulp Effluents. Purdue Hill, AL. (1988-90)

Project Manager. Bioassay Testing and Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for continuing Biannual Short-Term Chronic Bioassays of Chemical Effluents. Huntsville, AL. (1987-90)

Project Manager. Bioassay Testing and Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for Definitive Test (LC50) Bioassays of Oil Refinery Storm Water Run-Off Effluents. Saraland, AL. (1987-90)

Project Manager. Bioassay Testing And Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for continuing Monthly Definitive Test (LC50) Bioassays of Industrial Effluents. Axis, AL. (1986-90)

Project Manager. Bioassay Testing and Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for continuing Biannual Short-Term Chronic Bioassays of Industrial Effluents. Aberdeen, MS. (1986-90)

Project Manager. Bioassay Testing and Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for Definitive Test (LC50) Bioassays of Municipal Wastewater. Graceville, FL. (1986)

Project Manager. Bioassay Testing and Analysis. Responsible for scheduling, computer analysis, quality control and reporting of test results for Definitive Test (LC50) Bioassays of Paper Pulp Effluents. Subcontract P.E. LaMoreaux and Associates. (1986)

Project Scientist. Bioassay Testing and Analysis. Responsible for scheduling, quality control of physiochemical parameters and test data, computer analysis and reporting of test results for continuing Bimonthly Acute Screening Test Bioassays of Pre and Post Chlorinated Municipal Wastewater. Marianna, FL. (1986)

Project Scientist. Bioassay Testing and Analysis. Performed scheduling, physiochemical parameters, testing, and reporting of test results for Monthly Definitive Test Bioassays of Industrial Effluents. Axis, AL. (1986-90)

Project Scientist. Bioassay Testing and Analysis. Performed scheduling, physiochemical parameters, testing, and reporting of test results for Quarterly Acute Screening Test Bioassays of Industrial Effluents. Subcontract BCM Converse. (1986)

Project Scientist. Bioassay Testing and Analysis. Performed scheduling, physiochemical parameters testing and reporting of test results for Definitive Toxicity Testing of Industrial Effluents of Variable Conductivity. Theodore Industrial Park, Theodore, AL. (1986)

Biological Technician. Bioassay Testing and Analysis. Performed physiochemical parameters, data collection, and testing for Definitive Test (1986) Bioassays of single and combined Industrial Effluents. Subcontract BCM Converse. (1986)

Biological Technician. Bioassay Testing and Analysis. Performed physiochemical parameters, data collection and testing for Acute Screening Test Bioassays of Industrial Effluents. Subcontract BCM Converse. (1985)

Biological Technician. Bioassay Testing and Analysis. Performed physiochemical parameters, data collection and testing for Acute Range Finder Test Bioassays of Industrial Effluents. Subcontract BCM Converse. (1985)

Ecological Project Experience

Field Task Manager. Environmental Impact Assessment and Isopleth Study. Responsible for scheduling, data collection and preliminary analysis for monitoring in-stream concentration Isopleths. (1986)

Benthic Task Manager. Environmental Impact Assessment. Responsible for scheduling, collection, identification, quality control and reporting of benthic data collected for Monitoring Environmental Impacts Associated with Open-Water Thin-Layer Disposal of Dredged material at Fowl River, AL. (1986)

Project Scientist. Marine Benthic Invertebrate Analysis. Port Charlotte, Fort Pierce and Miami Florida Dredge Disposal studies, east and west coast of Florida. (1985-86)

Biological Technician. Benthic Invertebrate Analysis. Performed sorting and preliminary analysis of macroinvertebrates from several Florida freshwater systems. (1985-86)

Research Assistant. Environmental importance of sea grasses to estuarine organisms, including stomach content analysis of fishes. Dauphin Island Sea Lab. (1985)

Field Operator. Extensive collection and preservation of ichthyoplankton in association with research on the presence and abundance of fish eggs and larvae within Mobile Bay and adjacent areas. (1985)

Laboratory Technician. Soil and sediment analysis for the U.S. Soil Conservation Service. (1982)

Other Experience

Graduate level courses in estuarine and salt marsh ecology, including extensive characterization and analysis of physical parameters, flora and fauna. Additional course work involved sediment analysis and foraminiferan identification as a tool in sediment stratigraphy. (1984-85)

TAI ENVIRONMENTAL SCIENCES, INC.

1717 OLD SHELL ROAD MOBILE, ALABAMA 36604 (205) 479-0394

H. DEVIN DEDEAUX
TAI Environmental Sciences

Areas of Specialization

Fisheries, Field Operations, Biology, Marine Geology, Marsh Ecology.

Education

Mississippi Gulf Coast Junior College (Gulfport, MS)
Associates Degree: Biology
May 1979

University of South Alabama (Mobile, AL)
B.S.: Marine Biology
June 1986

Relevant Project Experience

Field Coordinator. Dredged Material Disposal Assessment. Head of field team collecting a variety of environmental data including physical/chemical, benthic invertebrate, sediment profile imagery and fisheries trawl data. Data are in support of Monitoring Environmental Impacts Associated with Open-Water Thin-Layer Disposal of Dredged Material at Gulfport Harbor, Mississippi. (1986-88)

Field Coordinator - Organized all field activities associated with underwater sediment profile imagery of a dredged material disposal mound in the Northern Gulf of Mexico. (1987)

Field Coordinator. Environmental Impact Assessment. Responsible for overall field operations including personnel,scheduling, equipment and supplies. Also responsible for vessel maintenance and record keeping of field efforts associated with Monitoring Environmental Impacts Associated with Open-Water Thin-Layer Disposal of Dredged Material at Fowl River, Alabama. (1986-87)

Project Scientist. Assisted in the collection of isopleth data as part of a comprehensive mixing zone analysis study. (1986)

Field Operator. Environmental Monitoring. Performed field collections of macroinvertebrates and fishes, as well as laboratory preparation, sorting and preliminary analysis of samples. (1986)

Project Scientist. Benthic Invertebrate Analysis. Performed sorting and taxonomic identifications of macrobenthos from several Florida freshwater systems. (1986)

Project Scientist. Radiological Monitoring. Performed field collection of fishes, invertebrates and plants for Annual Radiological Monitoring Program. Naval Submarine Base, Kings Bay, Georgia. (1986)

Fisheries Biologist. Served as on-board biologist on the Japanese long-liner fishing vessel Tsune Maru #31, through the National Marine Fisheries Service. Responsible for observing overall fishing practices including estimating daily catches, length frequencies, sex ratios, collection of otoliths and maintenance of records on marine mammal sightings in Bering Sea. Also responsible for reporting incidental landings of halibut, salmon and king crab. (1985)

Other Experience:

Coastal sediment studies including sampling, size analysis, and interaction of sediments with physical conditions such as tides, longshore currents, and prevailing winds.

Specialized courses in Fisheries biology, Marsh ecology, Marine geology, Paleoecology and Marine technical methods through Dauphin Island Sea Lab. Also, gained experience through tidal marsh and fisheries population studies, including mark-recapture, life cycle, habitat analysis and size distributions.

TAI ENVIRONMENTAL SCIENCES, INC.

1717 OLD SHELL ROAD MOBILE, ALABAMA 36604 (205) 479-0394

VICKI E. SPENCE

TAI Environmental Sciences, Inc.

Areas of Specialization

Biology and Chemistry

Education

Mobile College (Mobile, AL)
2 years toward B.S. degree

Relevant Project Experience

Toxicologist. Assisted in laboratory set up, data recording, daily maintenance and initial analysis for chronic toxicity test of industrial effluent. (1988-90)

Toxicologist. TAI Laboratories. Responsible for laboratory analyses, and QA/QC of instrumentation and standard reference toxicant program. (1986-90)

Toxicologist. Participated in laboratory set up, data recording, and initial analysis for monthly acute toxicity testing of several chemical plant effluents. (1987-90)

Toxicologist. Assisted in all stages of laboratory procedures for acute toxicity testing of several municipal effluents. (1987-90)

Toxicologist. Assisted in laboratory procedures, set up, maintenance and data recording, for monthly acute toxicity testing of a paper mill effluent. (1987-90)

Toxicologist. Participated in all stages of laboratory procedures for 96 hour acute toxicity tests of several oil company drill muds.

Biological Technician. Dredged Material Disposal Site Investigations. Responsible for sample processing and curation including staining and preserving, sorting and preliminary identification of specimens and tabulating data. Experience includes Northern and Eastern Gulf of Mexico, Bahamas and Eastern seaboard. (1986-90)

TAI ENVIRONMENTAL SCIENCES, INC.

1717 OLD SHELL ROAD MOBILE, ALABAMA 36604 (205) 479-0394

YOLANDA C. TURNER
TAI Environmental Sciences, Inc.

Areas of Specialization:

Laboratory Analysis, Biology and Analytical Chemistry.

Education:

Alabama A&M University
B.S.: Chemistry
1986

Hobson State Technical College
A.S.: Computer Science
1988

Relevant Project Experience

Toxicologist. TAI Environmental Sciences, Inc. Assisted in laboratory set up, data recording, daily maintenance and initial analysis for chronic toxicity test of industrial effluent. (1989-90)

Toxicologist. Assisted in laboratory analyses, and QA/QC of instrumentation and standard reference toxicant program. (1989-90)

Toxicologist. Participated in laboratory set up, data recording, and initial analysis for monthly acute toxicity testing of several chemical plant effluents. (1989-90)

Toxicologist. Assisted in all stages of laboratory procedures for acute toxicity testing of several municipal effluents. (1989-90)

Toxicologist. Assisted in laboratory procedures, set up, maintenance and data recording, for monthly acute toxicity testing of a paper mill effluent. (1989-90)

Research Assistant. Alabama A&M University. Performed duties as an aid to professor doing research in polymer chemistry. (1986)

Laboratory Technician. Anniston Army Depot. Performed oil analysis, acid vat analysis, electro-plating vat analysis, shelf-life testing and hardness testing. (1985)

Laboratory Assistant. Alabama A&M University. Perform duties in setting up labs, assisting student in the labs, being aware of chemicals, glassware and other equipment used and needed in stock rooms. (1984)

Biological Technician. Environmental Assessments. Performed initial analyses, including sorting identifications and data preparation for benthic samples collected using artificial substrate samples. Experience includes all of Southeastern United States. (1986-90)

Bioassay Technician. Responsible for bioassay testing of wastewater and industrial effluents to determine environmental toxicity. Includes test preparation, loading test organisms and periodic monitoring and recording of test results and physiochemical parameters. (1986-90)

Other Experience

Familiar with a wide variety of analytical laboratory equipment including analytical balance, environmental probes (chloride, ammonia, pH, (DO) and conductivity, etc), microscopes (compound and stereo), spectrophotometer and all associated hardware. Additional experience gained in proper laboratory labeling and record keeping, analytical procedures, sample handling and preparation as well as sample curation and storage.

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MARK ROTCH

TAI Environmental Sciences, Inc.

Areas of Specialization:

Aquaculture and Marine Biology.

Education:

University of West Florida (Pensacola, FL)
B.S.: Environmental Resource Management and Planning
1989

Pensacola Junior College (Pensacola, FL)
A.S.: General Education
1984

Relevant Project Experience:

Bioassay Technician. Responsible for bioassay testing of wastewater and industrial effluents to determine environmental toxicity. Includes test preparation, loading test organisms and periodic monitoring and recording of test results and physiochemical parameters. (1990)

Aquaculturist. Responsible for all phases of in-house stock culture feeding, maintenance and record keeping for five freshwater and marine species of toxicity testing organisms, both vertebrate and invertebrate. (1989-90)

Biological Technician. Participated in preliminary sorting of macroinvertebrates collected from several Florida freshwater systems. (1989-90)

Laboratory Assistant. Environmental Protection Agency (EPA). Assistant in several different research experiments which involved collecting, sustaining and analyzing microcosms of Escambia Bay. Experiments usually involved the handling of radioactive material (c-14). (1989)